Hepatitis B, acute

Overview[1,2]

For a complete description of hepatitis B, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition[3]

Clinical Definition

Hepatitis B:

An acute illness with:

a) Discrete onset of symptoms

b) Jaundice or elevated serum aminotransferase levels

Perinatal Hepatitis B:

Perinatal hepatitis B in the newborn may range from asymptomatic to fulminant hepatitis.

Laboratory criteria for diagnosis

Hepatitis B:

1. IgM antibody to hepatitis B core antigen (anti-HBc IgM) positive (if done) or hepatitis B surface antigen (HBsAg) positive

2. IgM anti-HAV negative (if done)

Hepatitis B Perinatal:

Hepatitis B surface antigen (HbsAg) positive

Case classification

Hepatitis B:

Confirmed: a case that meets the clinical case definition and is laboratory confirmed.

Case Definitions for Probable, Suspect, Old and Carrier Cases: [5]

Clinical description:

Cases in these categories may or may not have an acute onset of illness or symptoms and may or may not have elevated liver enzyme test results. Additional information is required to correctly classify the case.

Probable: A case that is positive for Hepatitis B core IgM Antibody (Anti-HBc IgM) but symptom history is currently unavailable and the case has not been reported previously. This case should remain open until information is available to reclassify the case. [5]

Suspect: A case that is positive for Hepatitis B Surface Antigen (HBsAg) and does not have symptoms and is either negative for Hepatitis B Core IgM (Anti-HBc IgM) or Anti-HBc IgM results are not available. (5)

Old: A case that is negative for Hepatitis B Surface Antigen (HBsAg) and does not have symptoms and is positive for Hepatitis B Core Antibody Total (Anti-HBc) and is negative for Hepatitis B Core IgM (Anti-HBc IgM) or Anti-HBc Igm results are not available. (5)

Carrier: A case that has been positive for Hepatitis B Surface Antigen (HBsAg) for more than six months OR a case that is positive for Hepatitis B Surface Antigen (HBsAg) and is positive for Hepatitis B Core Antibody Total (Anti-HBc) and is negative for Hepatitis B Core Igm (Anti-HBc IgM). (5)

Overview of Case Definitions for Hepatitis B

Case Definition	Discrete onset of symptoms	Jaundice or elevated liver functions	HBsAg	Anti-HBs	Anti-HBc	Anti-HBc IgM	HAVIgm
Confirmed	Yes	Yes	+	Unk	Unk	+ (If done)	- (If done)
Probable	Unk	Unk	+	Unk	Unk	+	Unk
Suspect	No	No	+	Unk	Unk	- (If done)	Unk
Old	No	No	-	Unk	+	-	Unk
Carrier*	No	No	+	Unk	+	-	Unk

* A case that has been positive for HBsAg for more than six months also fits within the case definition of carrier.

Perinatal Hepatitis B:

Confirmed: HBsAg positivity in any infant aged >1-24 months who was born in the United States or in U.S territories to an HBsAg-positive mother.

Comment:

1. Infants born to HBsAg-positive mothers should receive hepatitis B immune globulin (HBIG) and the first dose of hepatitis B vaccine within 24 hours of birth, followed by the second and third doses of vaccine at 1 and 6 months of age, respectively. Post-vaccination testing for HBsAg and the antibody to HBsAg (Anti-HBsAg) is recommended from 3 to 6 months following completion of the vaccine series. If HBIG and the initial dose of vaccine are delayed for >1 month after birth, testing for HBsAg may determine if the infant is already infected. If vaccine is not available at birth, the first dose should be given prior to discharge, but not later than 7 days after birth.(4)

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted? What were the results? What are the case's clinical symptoms? Is this an acute case or is this a hepatitis B carrier? Do a search in MOHSIS to reveal any previous history of hepatitis B. What is the individual's vaccination status?
Contact the District Immunization Representative immediately if the case is prenatal or perinatal regardless of case classification.
Establish the extent of illness. Determine if household or other close contacts are, or have been ill, by contacting the health care provider, patient or family member.
Contact the District Communicable Disease Coordinator if cases are in high-risk settings or jobs such as health care.

Case/Contact Follow-Up And Control Measures

Determine the source of infection:

- Is this a perinatal exposure?
- Did this case have a percutaneous or permucosal exposure?
- Did this case have unprotected sex with a hepatitis B positive partner?
- Have there been other cases linked by time, place or person?
- Did this person have household exposure to another hepatitis B case or carrier?

Determine the risk of infection to others and to contact those who may be at risk:

- Is the case pregnant?
- Does this case have unprotected sex with multiple partners?
- Does this case participate in the use of intravenous drugs or any activity that may involve the sharing or re-use of needles such as tattooing/body piercing?

Control Measures

See the Viral Hepatitis B and Delta Hepatitis sections of the Control of Communicable Diseases Manual (CCDM), "Control of Patient, Contacts and the Immediate Environment".

See the Hepatitis B and Hepatitis D sections of the Red Book.

Contact the District Immunization Representative to arrange for vaccination of household contacts and other high-risk individuals. Further information on who is eligible for these vaccinations can be found in the Section of Vaccine Preventable and Tuberculosis Disease Elimination (SVPTDE) Immunization Guidelines Manual.

Laboratory Procedures

1. For confirmation of a suspected case of hepatitis B, use a Missouri State Public Health Laboratory (SPHL) virus serology kit.
2. The SPHL does NOT perform Delta hepatitis testing. If Delta hepatitis is suspected, recommend that the physician submit the specimen to a commercial laboratory for testing. If a commercial laboratory is not an option, contact the District Communicable Disease Coordinator and he/she will coordinate sending the specimen to CDC.
3. Draw one red-top tube of blood, using standard precautions.
4. Either send serum OR whole blood:

   To send serum:
   - Allow blood to stand for 30 minutes to 1 hour
   - Centrifuge at 2000 rpm for 5 minutes
   - Pour clear serum into another red top tube*
   - Discard clot tube safely

   NOTE: Hot or cold weather conditions can hemolyze whole blood, making it unsuitable for testing. Specimens should be sent as serum under these conditions.

5. Wipe off outside of tube with alcohol.
6. Label tube carefully; include patient's name and date sample obtained. Samples without this information on both the tube and request form *will not be tested and will be discarded.*
7. Fill out lab form "Hepatitis Test Request", as completely as you can. If you are screening contacts mark the box labeled "Hepatitis B-EIA for (HBsAg)".
8. Immediately mail blood or serum; include form.
9. If the test is requested by a local public health agency, state the name of the LPHA on the lab form. If submitted by a private physician, he/she will be charged.

*The state lab cannot provide the extra red top tubes.
FOR ADDITIONAL INFORMATION, CONTACT THE DISTRICT COMMUNICABLE DISEASE COORDINATOR

Interpretation of Specific Serological Tests for Hepatitis B:

Antigens: Parts of the virus itself.

Test	Interpretation
HBsAg Hepatitis B Surface Antigen	Infectious – Surface antigen appears in the serum as early as 1-2 and as late as 11-12 weeks after exposure to HBV. It is usually the first viral marker to appear in the blood after HBV infection. In self-limited infections (not a carrier), HBsAg remains detectable in the blood for 1-6 weeks although it may persist for as long as 20 weeks. 95% of patients are HBsAg positive at the onset of symptoms and jaundice. HBsAg generally disappears with recovery. In some patients, HBsAg clears rapidly and may be absent at the time the patient is tested. Between 5-10% of patients infected with HBV do not clear HBsAg and become carriers. A patient with HBsAg that persists beyond 6 months after acute infection or a previously positive HBsAg test is considered a carrier. HBsAg persists indefinitely in carriers. Look at antibody tests and any previous viral hepatitis serology tests to determine whether the case has been recently infected or is a carrier.
HBeAg Hepatitis B "Early" Antigen	Highly Infectious- HBeAg is another regular and early marker of HBV infection. HBeAg appears simultaneously or within a few days of the appearance of HBsAg in most primary infections. Its titer peaks and then declines in parallel with HBsAg. HBeAg usually disappears just before the disappearance of HBsAg in self-limited infections. Patients who remain HBeAg positive for 10 weeks or longer appear likely to become carriers. Look at antibody tests and any previous viral hepatitis serology tests to determine whether the case has been recently infected or is a carrier.

Antibodies: Proteins developed by the body's immune system in response to antigens.

Test	Interpretation
Anti-HBc Hepatitis B Core Antibody Total	Indeterminate infectiousness- Anti-HBc titers usually rise during the period of HBsAg positivity, level off, and slowly fall after HBsAg becomes undetectable. Anti-HBc can be detected for 5 to 6 years after acute infection in both carriers and non-carriers. Anti-HBc is the combination of IgM and IgG class antibodies (Anti-HBc IgM and Anti-HBc IgG). Look at Anti-HBc Igm to determine recent infection. Look at antigen tests to determine whether the case is currently infectious.
Anti-HBc Igm or HBcIgm Hepatitis B Core IgM Antibody	Indeterminate infectiousness, Recent infection-Anti-HBc IgM is one class of Hepatitis B Core antibodies. Anti-HBc has been found in almost all patients with acute hepatitis B. Anti-HBc Igm rapidly decreases in titer after infection and is no longer detectable within 6-24 months. **A positive Anti-HBc Igm serology is an indication of recent infection.** A chronic hepatitis B carrier should test negative for Anti-HBc Igm. Look at antigen tests to determine whether the case is currently infectious.
Anti-HBc IgG or HBcIgG Hepatitis B Core IgG Antibody	Indeterminate infectiousness-The individual was infected at some time in the past. This test alone does not give any indication of when in the past. Look at Anti-HBc Igm to determine recent infection. Look at antigen tests to determine whether the case is currently infectious.
Anti-HBe Hepatitis B "Early" Antibody	Probably less infectious- Anti-HBe appears in most patients at the time HBeAg becomes undetectable or shortly thereafter. Anti-HBe persists for 1 to 2 years after resolution of HBV infection. Look at Anti-HBc Igm to determine recent infection. Look at antigen tests to determine whether the case is currently infectious.
Anti-HBs or **HBsAb** Antibody to Hepatitis B Surface Antigen	Immune- Anti-HBs develops after a resolved infection and is a marker of long-term immunity. This is the only positive test for an uninfected, vaccinated individual. It may take several months for this antibody to appear after infection or vaccination and in some cases does not appear at all. However, this antibody will likely persist for several years when it does appear.

Interpretation of Several Combinations of Hepatitis B Serologic Tests

Tests for HBV				Interpretation
HBsAg	**Anti-HBs**	**Anti-HBc**	**Anti-HBc IgM**	
+	–	–	–	Very recent, acute HBV infection (infectious)
+	–	+	+	Acute HBV infection (infectious)
+	–	+	–	Chronic HBV infection with HBsAg carriage (infectious)
–	–	+	+	Acute HBV infection, anti–HBs has not yet appeared (may be infectious)
–	+	+	+	Resolving acute HBV infection (may be infectious)
–	+	+	–	HBV infection in the remote past (Immune)
–	–	+	–	HBV infection in the remote past (Immune)
–	–	–	Not Tested	No hepatitis B infection, if liver abnormalities exist they are due to another virus, toxin or condition
–	+	–	Not Tested	Post hepatitis B vaccine or post HBIG

Reporting Requirements

Hepatitis B is a Category II disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (DHSS) within 3 days of first knowledge or suspicion.

1. For all cases, complete a Disease Case Report form (CD-1).
2. For confirmed, probable, suspect and perinatal cases, complete the "Viral Hepatitis Case Report" form (CDC 53.1), front and back. Detach and complete the worksheet on the back (this is necessary to prevent the carbons from marking on the front of the form). Staple the completed worksheet to the form.
3. If this is a prenatal or perinatal case, contact the District Immunization Representative. Fill out the "Prenatal Hepatitis B Case Report" form (IMMP-29) and the "Perinatal Hepatitis B Case Report" form (IMMP-29A). These forms, policy, and guidelines can be found in the Section of Vaccine Preventable and Tuberculosis Disease Elimination (SVPTDE) Immunization Guidelines Manual.
4. If prophylaxis is provided using hepatitis B vaccine and/or HBIG supplied by DHSS, SVPTDE, complete forms and follow protocol in the Immunization Guidelines Manual.
5. Entry of the complete CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the District Health Office.
6. Send the completed secondary investigation form(s) to the District Health Office.
7. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
8. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References

1. Chin, James, ed. "Hepatitis B and Delta Hepatitis." Control of Communicable Diseases Manual, 17th Ed. Washington, D.C.: American Public Health Association., 2000: 243-251, 253-255.
2. American Academy of Pediatrics. "Hepatitis B and Hepatitis D." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 289-302, 306-308.
3. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997:46 (No.RR-10): 18-19.
4. Atkinson, William, et al. Eds. Epidemiology and Prevention of Vaccine-Preventable Diseases; 7th Ed.: Atlanta: National Immunization Program, Centers for Disease control and Prevention, 2002: 223-245.
5. Missouri Department of Health and Senior Services - Section of Communicable Disease Control and Veterinary Public Health surveillance case definition.
6. Missouri Department of Health and Senior Services – Section of Vaccine-Preventable and Tuberculosis Disease Elimination Immunization Guidelines, Section 345, Subsection 345.07.
7. Mandell, GL, Bennett, JE, and Dolin, R, ed. *Mandell Douglas and Bennett's Principles and Practice of Infectious Diseases*, 5th ed. New York: Churchill Livingstone, 2000.

Other Sources of Information

Evans, Alfred S. and Richard A. Kaslow, Eds. Viral Infections of Humans Epidemiology and Control; 4th ed. Eds.. New York: Plenum, 1997: 375-387.